

Explosive Detection and Testing

INL has developed a remote explosives detection system for the Department of Defense



Performing research, developing technologies, and conducting field testing for real-world solutions.

Terrorist bombings of U.S. military posts and government installations are on the rise throughout the world. In addition, experts are concerned that these attacks could spread to various types of U.S. infrastructure facilities, ranging from power distribution stations and dams to subways and sports complexes.

Idaho National Laboratory is attacking this threat head-on with comprehensive research, field-ready technologies, and the facilities and multidisciplinary teams of experts to develop and test systems and solutions.

INL scientists, experts in ion mobility and secondary ion mass spectrometry, are

conducting research and performing testing on trace explosives detection systems for the U.S. Department of Homeland Security and other federal agencies. They perform explosive forensic analysis, design improved sensors and develop detection testing protocols and standards.

INL maintains a Class II, Division I Operations Room for explosives assembly and a BATF-certified magazine for explosives storage.

INL scientists perform testing on trace explosives detection systems for TSA at its on-site laboratory.

INL scientists and engineers also have extensive expertise in bulk explosives detection technologies and are involved in the development and demonstration of the Idaho Explosives Detection System (IEDS) for cargo truck inspections at entry points to Department of Defense facilities. INL is also developing other bulk explosives detection technologies for DHS and DoD customers such as modifying its award-winning detection technology – the portable isotopic neutron spectroscopy system (PINS).

Research

INL is conducting research in diverse areas addressing a multitude of explosives-related issues.

Enhanced Explosives Testing

Use large-magnitude explosive devices to validate blast effects models and to determine the effectiveness

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National Security





INL's explosive test range enables our scientists to conduct experiments using large-magnitude explosive devices to validate the effectiveness of physical security barriers, to quantitatively identify the threat and to develop methods for mitigating vulnerabilities.

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of security barriers and other protective structures.

Next-Generation Neutron Generator

Develop a reliable, portable neutron generator for use with INL-developed prompt gamma-ray neutron activation analysis systems that is used worldwide to characterize munitions filled with explosives or chemical agents.

Next-Generation Imaging Systems for Stand-Off Detection of Suicide Bombing Suspects

Design, develop and test an imaging and analysis system to enhance the stand-off detection of explosives

concealed under clothing using passive, long wave infrared sensors.

Advanced Automated Ion Mobility Spectrometer for Explosives Detection

Design, model and fabricate a simultaneous dual-mode IMS with a unique automated spectral interpretation system to improve detection limits and resolution while enabling simultaneous detection of a greater number of compounds including explosives and chemical warfare agents.

Testing

INL has the capabilities to test a wide range of explosives threats, measure their effects on structures and protective barriers, and evaluate the effectiveness of potential countermeasures.

INL has the ability to detonate large explosive charges to quantitatively characterize explosives threats. Most physical barrier design data is untested and relies heavily on empirical calculations. Security designs are based on extrapolations from textbook equations developed for the design of common construction materials. Terrorist bombing, a new tactic against national security, challenges our understanding of barrier performance against this threat. INL's explosives test range enables our scientists to safely detonate large-scale

explosives, record dynamic effects, measure/record pressure-time histories, crater size, barrier damage, and the extent of the debris. These test data are then used to validate blast effects models, enhance the accuracy of vulnerability assessment models, and support the development of improved protective structures.

Facilities

INL's Test Range – 32 miles west of Idaho Falls, Idaho – is remote and secure yet still convenient to airport, interstate and rail. The Site contains clusters of facilities – similar to several small cities. The remainder of the land is native rolling landscape.

INL has operated research and development, manufacturing and waste management programs for more than 50 years, resulting in a complex internal infrastructure containing facilities representative of the nation's critical infrastructure. Many of these facilities – active and inactive – are available for isolatable tests. Additionally, INL has established several specific test beds that can be used to conduct independent or integrated tests. These include:

- SCADA/Control System
- Powergrid
- Unmanned Aerial Vehicles
- Wireless Communications
- Cyber Security
- Active Interrogation



INL scientists demonstrated explosives detection using active interrogation technologies